
DETERMINING the VALUE

of LEASES for

ANNUAL RANGELAND



Cooperative Extension **University of California**
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DETERMINING THE VALUE OF LEASES FOR ANNUAL RANGELAND

The value of a lease for grazing land depends on several factors including forage quantity and quality, producer and landowner costs. This leaflet includes discussion on, and examples of, methods for estimating livestock forage requirements, forage availability, forage quality, and seasonal influences on forage availability and quality. It also includes worksheets to aid livestock producers (lessees) and landowners (lessors) in negotiating fair lease values.

Lessees should analyze all costs to arrive at profitable lease prices (worksheet 1). Lessors should examine their expenses to set prices that meet their needs (worksheet 2). In addition, the forage resource has a value based on the volume and quality of feed available (worksheet 3). It is unlikely that calculations on each worksheet will lead to identical values. Nor will the numbers calculated to be the "true value" of the lease. **They will be a starting point from which the contractual value can be negotiated.**

For information on formulating leases for grazing land, read *Developing Livestock Leases for Annual Grasslands*, Leaflet 21424, University of California ANR Publications.

Section I

Estimating Feed Requirements

Before entering into a lease and negotiating a price, it is necessary to estimate the forage requirement of the livestock and forage availability. The Animal Unit (AU) is the standard measurement of livestock forage requirements (used in range analysis, soil surveys, etc.). One Animal Unit Month (AUM) is the amount of feed required to support one AU for one month. This value depends on the type of feed used (i.e., 1 AUM=1,000 lb of air dry forage, 800 lb of hay, 533 lb of concentrate, etc.). Table 1 shows AU values for various species at different production stages.

Table 1. ANIMAL UNIT VALUES

Animal type	AU × 1,000 =	Monthly forage requirement/head (lb air dry forage)
Mature cow with calf	1.00	1,000
Mature bull	1.25	1,250
Weaned calf	0.6	600
Yearling 12-17 mo.	0.7	700
Yearling 17-22 mo.	0.75	750
Mature horse	1.25	1,250
Ewe with lamb	0.20	200
Ram	0.20	200
Weaned wether	0.17	170
Doe goat with kid	0.17	170
Buck	0.17	170
Weaned wether	0.14	140
Llama	0.3	300

To determine the total monthly forage requirement, multiply the monthly forage requirement per head (table 1) by the number of animals to be grazed.

$$\begin{array}{r} \text{Monthly} \\ \text{Forage} \\ \text{Requirement/} \\ \text{Head} \end{array} \times \begin{array}{r} \text{Number} \\ \text{of} \\ \text{Animals} \end{array} = \begin{array}{r} \text{Total} \\ \text{Forage} \\ \text{Required/} \\ \text{Month} \end{array}$$

Multiply the total monthly forage requirement by the length of the grazing season (in months) to calculate the total forage required.

$$\begin{array}{r} \text{Total} \\ \text{Forage} \\ \text{Required/} \\ \text{Month} \end{array} \times \begin{array}{r} \text{Grazing} \\ \text{Season} \\ \text{(Mo.)} \end{array} = \begin{array}{r} \text{Total} \\ \text{Forage} \\ \text{Required} \end{array}$$

Example 1:

50 cows with 3-month-old calves are to be grazed for 4 months:

1,000 lb/mo. × 50 cows = 50,000 lb of forage/month (from table 1)

50,000 lb/mo. × 4 months = 200,000 lb of forage/lease term

Section 2

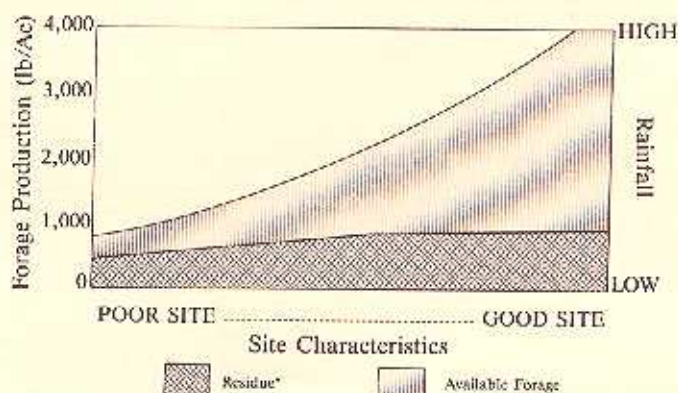
Estimating Available Forage

The second step in developing a lease is to determine the quantity of forage available. Total annual forage production for a pasture can be estimated using the graph in figure 1.

Evaluate the quality of the site, the relative amount of precipitation (10 inches is low, 40 inches is high) and find the forage production value that matches your conditions. The values in figure 1 are averages for conditions all over California, so use your own judgment and experience to modify the value from the graph. Note both the total production and the amount of residue that should be left after grazing.

More precise production estimates can be made using a variety of methods. Some of these are described in *Annual Grassland Forage Productivity*, leaflet 21378 and *Guidelines For Residue Management On Annual Range*, leaflet 21327, available from University of California ANR Publications.

Figure 1. Productivity of Dryland Pastures
(pounds of dry matter per acre)



*Residue levels vary with slope and other factors.

To calculate the total available forage, subtract the desired residue level from the production value estimated from figure 1 and multiply the difference by the number of grazable acres.

$$\left(\begin{array}{c} \text{Production} \\ \text{per acre} \\ \text{(figure 1)} \end{array} \right) - \left(\begin{array}{c} \text{Residue} \\ \text{per acre} \\ \text{(figure 1)} \end{array} \right) \times \text{Acres} = \text{Available forage}$$

Example 2:

There are 100 grazable acres on which average production is estimated at 2,000 pounds per acre. The desired residue level is 750 pounds per acre.

$$(2,000 \text{ lb/A} - 750 \text{ lb/A}) \times 100 = 125,000 \text{ lb of available forage}$$

Section 3 Adjusting Forage Production for Seasonal Influences

The production values in figure 1 are season-long averages. Since the quantity of available forage changes throughout the year, it is necessary to adjust available forage estimates for season of use. Multiply the production estimate by the adjustment values in table 2 to calculate total available forage. If a pasture is to be grazed more than one season, average the values for the seasons it will be grazed.

Table 2.
**SEASONAL FORAGE AVAILABILITY
ADJUSTMENT**

Season of use	Seasonal availability adjustment
Year long	1.0
Winter	0.7
Spring	1.3
Summer	0.8
Fall	0.6

To determine the total available forage, multiply the available forage (figure 1) by the seasonal adjustment (table 2).

$$\begin{array}{c} \text{Available} \\ \text{forage} \\ \text{(figure 1)} \end{array} \times \begin{array}{c} \text{Seasonal} \\ \text{adjustment} \\ \text{(table 2)} \end{array} = \begin{array}{c} \text{Total} \\ \text{available} \\ \text{forage} \end{array}$$

Example 3:

Grazing occurs from February 15 to May 15.

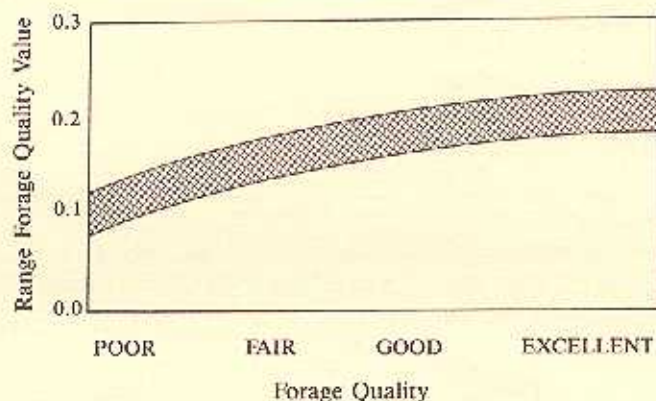
$$125,000 \text{ lb of forage (from previous example)} \times 1.3 \text{ (table 2)} = 162,500 \text{ lb of available forage}$$

The livestock in this example require 200,000 pounds of forage for the term of the lease (example 1). However, only 162,500 pounds of forage is available from the pasture. Since the total requirement exceeds total available forage, it may be necessary to provide supplemental feed, reduce animal numbers or grazing season, or take steps to increase forage production.

Section 4 Estimating Forage Quality

The quality of available forage will have an impact on animal performance and therefore affect the value of the pasture. The graph in figure 2 can be used to estimate forage quality value for a pasture.

Figure 2. Forage Quality on Dryland Pastures



Forage Quality Descriptions

Excellent

Improved grasslands: Includes areas that have been seeded and fertilized. Legumes and other desirable forbs are usually abundant. These lands may also support desirable perennial grasses. Slopes are usually flat to moderate.

Good

High-producing grasslands: These areas are characterized by deep soils. Legumes and other desirable forbs are usually conspicuous but not abundant. Slopes are usually flat to moderate.

Section 5 Using the Worksheets

Fair

Typical annual grasslands: Soils on these areas are relatively shallow but slopes are usually gentle to moderate. Native legumes and other desirable forbs may be present but are a relatively minor component of the vegetation.

Poor

Low-producing grasslands: These areas are characterized by shallow soils and steep rocky slopes. Legumes, other desirable forbs, and perennial grasses are usually absent. Annual weeds are usually conspicuous.

Seasonal Forage Quality Adjustment

Since forage quality changes seasonally, the forage quality value should be adjusted to account for this effect. To adjust the range quality value for seasonal changes, use table 3. If a pasture is to be used more than one season, average the values for the seasons to be grazed.

Table 3.
SEASONAL FORAGE QUALITY ADJUSTMENT

Season of use	Seasonal quality adjustment
Year long	1.0
Winter	1.1
Spring	1.3
Summer	0.8
Fall	0.6

To determine the forage quality factor, multiply the unadjusted forage quality value (figure 2) by the seasonal quality adjustment (table 3).

Unadjusted Forage Quality Value (figure 2)	×	Seasonal Quality Adjustment (table 3)	=	Forage Quality Factor
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Example 4:

Assuming the range is typical annual grassland with few native or seeded legumes, unadjusted forage quality is estimated at 0.15 from figure 2. From table 3 an adjustment of 1.3 for spring grazing is used (remember, the lease term is February 15 through May 15).

$$0.15 \times 1.3 = 0.195 = \text{Forage Quality Factor}$$

The worksheets on the following pages are intended to help you estimate lease values based on producer costs (worksheet 1), landowner costs (worksheet 2), and the quality and quantity of forage available (worksheet 3). Both lessees and lessors should complete worksheet 3. These estimates are not absolute values, but provide a starting point from which the contractual value can be negotiated.

Lease values have been expressed as total value, value per month, value per acre, value per AUM, or value per head. These values can be calculated in various units on each worksheet.

WORKSHEET 1: "BREAK EVEN" LEASE VALUE WORKSHEET FOR LESSEES

This worksheet will help producers calculate the maximum lease price that can be paid without losing money. The "break even" value is based on the costs associated with the livestock to be grazed on the leased range. It is not based on the quality of the forage resource.

WORKSHEET 2: "BREAK EVEN" LEASE VALUE WORKSHEET FOR LESSORS

This worksheet will help landowners calculate the minimum lease price that will cover costs associated with grazing. Landowners often experience costs that are not directly related to grazing. Grazing leases should not be expected to recapture these nongrazing costs. Nor should lease rates be based on the value of land for nongrazing uses (development potential, etc.).

WORKSHEET 3: FORAGE VALUE

Estimate the actual value of the forage resource on worksheet 3. This estimate is based on the quantity and quality of forage available. The value of the range forage is based on the current price per ton of oat hay and is adjusted to account for quality differences.

WORKSHEET 1

“BREAK EVEN” LEASE VALUE WORKSHEET FOR LESSEES

The break even value is the lease price at which expenses are met. It does *not* allow for profit. From this and the forage value worksheet (3), producers can determine a fair lease rate.

A. BEGINNING INVENTORY

	Type/Number/Weight	Value/Head \$	Total \$
1.	_____ / _____ / _____	_____	_____
2.	_____ / _____ / _____	_____	_____
3.	_____ / _____ / _____	_____	_____
Beginning value \$			_____ (A)

B. FORAGE REQUIRED (section 1)

(For each animal type, calculate the total forage requirement as shown in section 1. Add these totals to determine the overall forage requirement.)

Animal type	AU (table 1)	Number								
1.	_____	×	_____	×	1,000	=	_____	lb		
2.	_____	×	_____	×	1,000	=	_____	lb		
3.	_____	×	_____	×	1,000	=	_____	lb		
Total forage required/month							=	_____	lb	
_____							×	_____	=	_____ (B)
Total forage required/mo.								Grazing season (mo.)	=	Total forage required

C. FORAGE AVAILABLE (section 2)

$$\left(\frac{\text{Production per acre (figure 1)}}{\text{Residue per acre (figure 1)}} \right) \times \text{Grazable acres} = \text{Available forage}$$

$$\frac{\text{Available forage}}{\text{Seasonal availability adjustment (table 2)}} \times \text{Seasonal availability adjustment (table 2)} = \text{Total available forage} \quad (C)$$

(continued)

D. SUPPLEMENT REQUIRED

$$(C) \frac{\text{Total forage available}}{\text{Total forage required}} - (B) \frac{\text{Total forage required}}{\text{Total forage required}} = \text{_____} (D)$$

If "D" is negative, supplementation may be required. Amount of supplement will depend on the type of feed provided. Supplementation may also be required if forage quality is not adequate to meet the animal's nutritional requirement for a given level of performance. For more information, contact your UC Cooperative Extension farm advisor.

E. EXPENSES

	\$
Insurance (_____ % beginning inventory)	_____
Interest (_____)	_____
Utilities (_____)	_____
Advertising (_____)	_____
Health costs (_____ % beginning inventory)	_____
Transportation (_____)	_____
Materials (_____)	_____
Labor (_____ hr × \$ _____ /hr) =	_____
Supplemental feed (_____)	_____
Seed & fertilizer (_____)	_____
Other (_____)	_____
Total expenses	\$ _____ (E)

F. ESTIMATED ENDING INVENTORY

	Value/Head \$	Total \$
1. _____ / _____ / _____	_____	_____
2. _____ / _____ / _____	_____	_____
3. _____ / _____ / _____	_____	_____
	Ending value \$	_____ (F)

G. MAXIMUM LEASE VALUE

$$\left(\frac{(F) \$ \text{Ending value}}{\text{Ending value}} - (A) \right) \frac{\$ \text{Beginning value}}{\text{Beginning value}} - (E) \frac{\$ \text{Total expenses}}{\text{Total expenses}} = \$ \text{Break even lease value} (G)$$

$$(G) \$ \frac{\text{Break even lease value}}{\text{Break even lease value}} \div \frac{\text{Total acres}}{\text{Total acres}} = \$ \frac{\text{Break even lease value/acre}}{\text{Break even lease value/acre}}$$

$$(G) \$ \frac{\text{Break even lease value}}{\text{Break even lease value}} \div \left(\frac{\text{AU}}{\text{AU (table 1)}} \times \frac{\text{Number}}{\text{Number}} \times \frac{\text{Lease term}}{\text{Lease term}} \right) = \$ \frac{\text{Break even lease value/AUM}}{\text{Break even lease value/AUM}}$$

WORKSHEET 2

“BREAK EVEN” LEASE VALUE WORKSHEET FOR LESSORS

The break even value is the lease price at which expenses can be met. It does *not* allow for profit. From this and the forage value worksheet (3), landowners can determine a fair lease rate.

A. LAND COSTS*

Land payment (mortgage & principal)	\$ _____
Tax (property)	_____
Insurance	_____
Interest	_____

Total land costs \$ _____ (A)

B. OPERATING COSTS

Labor	\$ _____
Maintenance	\$ _____
Structures	_____
Fences	_____
Handling facilities	_____
Water developments	_____
Other (_____)	_____
Total maintenance costs	\$ _____

Total operating costs \$ _____ (B)

C. DEPRECIATION

	New value \$	+	Life span	=	Annual depreciation \$
Structures	_____	+	_____	=	_____
Fences	_____	+	_____	=	_____
Handling facilities	_____	+	_____	=	_____
Water developments	_____	+	_____	=	_____
Improvements (short term)	_____	+	_____	=	_____
Other (_____)	_____	+	_____	=	_____

Total annual depreciation costs \$ _____ (C)

D. TOTAL COSTS

(A) \$ _____ + (B) \$ _____ + (C) \$ _____ = \$ _____ (D)
 Land costs + Operating costs + Depreciation costs Break even lease value

(D) \$ _____ ÷ _____ = \$ _____ /month
 Break even lease value Lease term Break even lease value/month

(D) \$ _____ ÷ _____ = \$ _____ /acre
 Break even lease value Total acres Break even lease value/acre

*Based on land value for grazing.

WORKSHEET 3 FORAGE VALUE

Actual value of the forage resource depends on: the quantity and quality of forage available, accessibility of the range, season of use, and cost of substitute feeds. The formula below is a quick method to estimate the value of the forage in a pasture.

A. AVAILABLE FORAGE

$$\frac{\text{Total available forage (worksheet 1, part C)}}{\text{lb}} \div 1,000 \text{ lb} = \frac{\text{Available AUMs}}{\text{AUMs (A)}}$$

$$\text{(A) Available AUMs} \div 2 = \text{Tons of available forage (B)}$$

B. FORAGE QUALITY FACTOR

$$\frac{\text{Unadjusted forage quality value (figure 2)}}{\text{Seasonal forage quality adjustment (table 3)}} \times \text{Seasonal forage quality adjustment (table 3)} = \text{Forage quality factor (C)}$$

C. FORAGE VALUE

$$\text{(B) Tons of available forage} \times \text{(C) Forage quality factor} \times \$ \text{Cost per ton of oat hay} = \$ \text{Range forage value (D)}$$

$$\text{(D) \$ Range forage value} \div \text{(A) Available AUMs} = \$ \text{Value per available AUM}$$

$$\text{(D) \$ Range forage value} \div \left(\frac{\text{AU}}{\text{Number}} \times \text{Lease term} \right) = \$ \text{Value per AUM grazed}$$

$$\text{(D) \$ Range forage value} \div \text{Acres} = \$ \text{Value per acre}$$

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